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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/085,023      | 03/01/2002  | Hideo Kurihara       | 020137              | 0010             |

23850 7590 05/23/2003

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EXAMINER

WILSON, SCOTT R

| ART UNIT | PAPER NUMBER |
|----------|--------------|
|----------|--------------|

2826

DATE MAILED: 05/23/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/085,023

Applicant(s)

KURIHARA ET AL.

Examiner

Scott R. Wilson

Art Unit

2826

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM  
THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 09 April 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) 6-9 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4 is/are rejected.
- 7) ☒ Claim(s) 5 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 March 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- 1 ☒ Certified copies of the priority documents have been received.
- 2 ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
- 3 ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Drawings*

Figure 8 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

### *Election/Restrictions*

Applicant's election without traverse of claims 1-5 in Paper No. 5 is acknowledged.

### *Specification*

The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: TWO-BIT SEMICONDUCTOR MEMORY WITH ENHANCED CARRIER TRAPPING.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1 and 2 are rejected under 35 U.S.C. 102(b) as being anticipated by Eitan. As to claim 1, Eitan, Figure 8B, discloses a semiconductor memory comprising a pair of diffused layers (14) and (16) formed in a surface area of a semiconductor substrate, a gate electrode (24) formed on a gate insulating film (20) on the semiconductor substrate between said pair of diffused layers, so that carriers are trapped in the gate insulating film by applying a predetermined voltage to said gate electrode (col. 12, lines 13-25), wherein the gate insulating film is formed higher in carrier trap characteristic at position near said pair of diffused layers (68) than in a remaining area (layer 20 excluding region 68).

As to claim 2, the charge trap film which is higher in carrier trap characteristic than said gate insulating film (68) is formed in said gate insulating film at the positions near said pair of diffused layers.

Claims 1-4 are rejected under 35 U.S.C. 102(b) as being anticipated by Tomioka. As to claim 1, Tomioka, Figure 7F, discloses a semiconductor memory comprising a pair of diffused layers (109) formed in a surface area of a semiconductor substrate, a gate electrode (104) formed on a gate insulating film (103) and (112) on the semiconductor substrate between said pair of diffused layers, so that carriers are trapped in the gate insulating film by applying a predetermined voltage to said gate electrode (col. 2, lines 34-37), wherein the gate insulating film (112) is formed higher in carrier trap characteristic at position near said pair of diffused layers (112) than in a remaining area (103).

As to claim 2, Tomioka discloses the charge trap film which is higher in carrier trap characteristic than said gate insulating film (112) is formed in said gate insulating film at the positions near said pair of diffused layers.

Art Unit: 2826

As to claim 3, the gate insulating film of Tomioka is formed thinner at the positions near said pair of diffused layers (112) than in the remaining area (103).

As to claim 4, Tomioka discloses that the gate insulating film (103) and (112) is formed smaller in film thickness in electrical capacitance conversion at the positions near said pair of diffused layers (112) than in the remaining area (103).

*Allowable Subject Matter*

Claim 5 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. No prior art discloses a plurality of charge trap films formed atop one another under a gate electrode.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Scott R. Wilson whose telephone number is 703-308-6557. The examiner can normally be reached on M-F 8:30 - 4:30 Eastern.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan Flynn can be reached on 703-308-6601. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-1782.

Application/Control Number: 10/085,023

Page 5

Art Unit: 2826

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May 16, 2003

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14